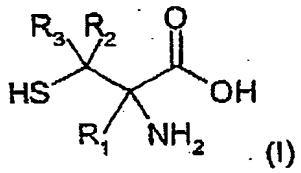
Claims:

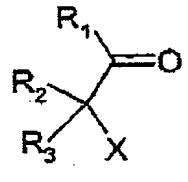
1. A process for preparing chiral mercapto amino acids of the formula



(I)

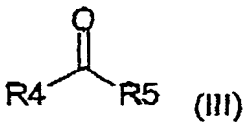
in which R_1, R_2 and R_3 may be identical or different and may be hydrogen, C_6-C_{12}-aryl, C_1-C_6-alkyl-C_6-C_{12}-aryl, C_6-C_{12}-aryl-C_1-C_6-alkyl, C_1-C_{18}-alkyl or C_2-C_{18}-alkenyl, where R_2 and R_3 may form a saturated or unsaturated ring, and the radicals may optionally be substituted one or more times by F, NO_2 or CN, characterized in that

a) an oxo compound of the formula



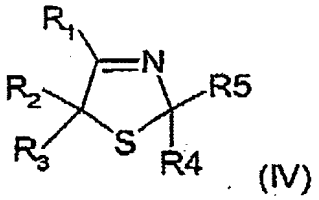
(II)

in which R_1, R_2 and R_3 are as defined above, and X is a leaving group from the group of Cl, Br, iodine, triflate, acetate or of the sulfonates, is reacted in the presence of ammonia or ammonium hydroxide and of a sulfide from the group of ammonium hydrosulfide, alkaline earth metal hydrosulfides or alkali metal hydrosulfides, where appropriate with phase-transfer catalysis or with addition of a solubilizer, with a ketone or aldehyde of the formula



(III)

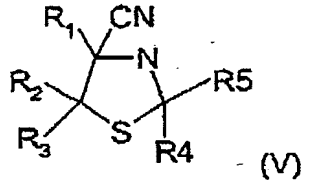
in which R_4 and R_5 may be identical or different and may be a C_1-C_{12}-alkyl radical or a C_6-C_{20}-aryl radical or one of the two radicals may be H, or R_4 and R_5 together form a C_4-C_7 ring which may optionally be substituted one or more times by C_1-C_6-alkyl or C_6-C_{20}-aryl, to give the compound of the formula



(IV)

in which R_1, R_2, R_3, R_4 and R_5 are as defined above, which

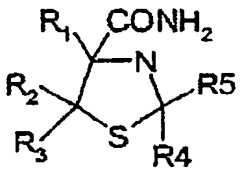
b) reacts with HCN to give the compound of the formula



(V)

in which R_1, R_2, R_3, R_4 and R_5 are as defined above, after which

c) the crystallized compound of the formula (V) is converted by selective hydrolysis using a mineral acid into the corresponding amide of the formula



(VI)

in which R_1, R_2, R_3, R_4 and R_5 are as defined above, and

d) subsequently converted using an amidase or a chiral resolving acid into the corresponding chiral amide of the formula (VI*), after which the desired chiral mercapto amino acid of the formula (I) is obtained by reaction with an acid, or

e) firstly the reaction of the amide with an acid is carried out, and subsequently the conversion into the desired chiral mercapto amino acid of the formula (I) takes place.

2. The process as claimed in claim 1, characterized in that in step a) from 1 to 5 mol of ketone or aldehyde of the formula (III), from 1 to 3 mol of sulfide compound and from 1 to 5 mol of ammonia or ammonium hydroxide are added per mol of oxo compound of the formula (II).

3. The process as claimed in claim 1, characterized in that in step a) a ketone of the formula (III) in which R_4 and R_5 together form a C_5-C_6 ring which may optionally be substituted one or more times by C_1-C_4-alkyl or phenyl is employed.

4. The process as claimed in claim 1, characterized in that in step b) HCN is employed as such, gaseous or liquid or as solution in water or organic solvents or prepared as intermediate from HCN and acid in an amount of from 1 to 5 mol per mol of thiazoline compound of the formula (IV).

5. The process as claimed in claim 1, characterized

in that step b) is carried out in a solvent from the group of water, C_1-C_4-alcohol, ester, ether or optionally halogenated, aliphatic or aromatic hydrocarbons or mixtures thereof.

6. The process as claimed in claim 1, characterized in that in step c) the crystallized nitrile of the formula (V) is suspended in the mineral acid and stirred at from 25 to 80°C for up to 15 hours, after which the amide of the formula (VI) is obtained as salt.

7. The process as claimed in claim 1, characterized in that step b) and c) take place as one-pot reaction, with the crystallized nitrile of the formula (V) not being isolated from the reaction mixture but being reacted immediately with the mineral acid to give the amide of the formula (VI).

8. The process as claimed in claim 1, characterized in that in step d) or e) an L-amidase prepared from *Mycobacterium neoaurum* ATCC 25795, *Mycobacterium smeginatis* ATCC 19420 or *Mycoplana dimorpha* IFO 13291 or a chiral resolving acid from the group of tartaric acid, dibenzoyltartaric acid, di-1,4-toluyltartaric acid, mandelic acid, p-bromomandelic acid, p-chloromandelic acid, p-tolytartaric acid, mandelic acid, p-bromomandelic acid, p-chloromandelic acid, p-methylmandelic acid, 10-camphorsulfonic acid, 3-bromocamphor-8-sulfonic acid, 3-bromocamphor-10-sulfonic acid, malic acid, 2-pyrrolidone-5-carboxylic acid, 2,3,4,6-di-O-isopropylidene-2-keto-L-gulonic acid, 2-(phenylcarbamoyloxy)propionic acid, 2-phenoxypropionic acid, aspartic acid, N-benzoylaspartic acid, 2-(4-hydroxy-phenoxy)propionic acid, (4-chlorophenyl)-2-isopropylacetic acid, 2-(2,4-

dichlorophenoxy)propionic acid, 2-hydroxy-4-phenylbutyric acid, 2-(4-chloro-2-methyl-phenoxy)propionic acid, N-benzoylglutamic acid, N-(p-nitrobenzoyl)glutamic acid, N-(p-chlorobenzoyl)glutamic acid, 3-phenyllactic acid or di-1,4-anisoyltartaric acid in their D or L form is employed.

9. The process as claimed in claim 1, characterized in that the reaction with the acid in step d) and e) is carried out under an inert nitrogen atmosphere at the reflux temperature.